

### **REMARKS**

Claims 1-3 and 11 remain in this application with claim 1 being in independent form. Claim 1-3 and 11 have been amended. There is full support in the specification as originally filed for these amendments. Accordingly, no new matter has been introduced by way of these amendments.

Claims 1-3 and 11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Porter (United States Patent No. 3,373,122) in view of Radovich (United States Patent No. 4,569,952). The Examiner contends that Porter discloses flexible polyurethane foams made from isocyanate, polyol, blowing agent, additives, amine catalysts, and an anhydride. The Examiner also contends that Radovich discloses that foams made with 1.7-3 or 2.2-3.2 parts water per 100 parts polyol make foams having the density as claimed and that these foams are used for mattresses, carpeting, and upholstery.

Applicant has amended claim 1 to more clearly define the novelty of the subject invention. Specifically, claim 1 has been amended to clarify that the mattress, carpet, and/or upholstery material comprises a foam having the density of 20 to 70 kg/m<sup>3</sup>. The foam is the reaction product of a) compounds which are reactive toward isocyanates in the presence of catalysts, blowing agents, additives and/or auxiliaries and b) a mixture of i) an isocyanate and ii) at least one organic or inorganic acid anhydride. The reaction of (a) and (b) is carried out in the presence of the (ii) at least one organic or inorganic acid anhydride and at least one urethane forming catalyst selected from the group consisting of organic amines, excluding alkanolamines, and organic metal compounds.

Claim 1, as amended, requires that the acid anhydride be in a mixture with the isocyanate. As discussed at length in the specification, the presence of the acid anhydride in the mixture with the isocyanate stabilizes the foamed product and prevents cleavages of polyurethane bonds by blocking amine catalysts when the foam is exposed to higher temperatures. Further, it has been found that the mixture of acid anhydride and isocyanate is stable at room temperature and the isocyanate groups do not react significantly, if it at all, with the acid anhydride groups. See page 4, lines 21-46. The stability of the foam and the

prevention of the cleaving of the bonds allow the foamed product to be exposed to hot or humid conditions without deteriorating. Examples of the hot or humid conditions include hot steam disinfection for sterilization of mattresses or hot steam cleaning of upholstered furniture or carpets. See page 5, lines 21-25.

Further, the acid anhydrides, if added to the compounds that are reactive with the isocyanates, such as a polyol, will have a tendency to achieve a limited component life. This results because the amine catalysts and the water present in such compounds contribute to the hydrolysis of the anhydride and reduces the activity of the catalysis even before the reaction is carried out. See page 14, lines 1-13. Therefore, one advantage of the subject invention is primarily achieved by adding the acid anhydrides in a mixture with the isocyanates instead of into a mixture with compounds that are reactive with the isocyanates.

In contrast, Porter discloses a process for preparing an improved polyurethane resin and specifically use of a polysiloxane-polyoxyalkylene copolymer composition and a polysiloxane-polyalkyleneoxy copolymer composition with an aliphatic carboxylic acid anhydride to form a foam. The mixture of the acid anhydride and the polysiloxane-polyoxyalkylene copolymer or the polysiloxane-polyalkyleneoxy copolymer is included with the mixture to be foamed. Column 1, lines 59-64. In other words, **the acid anhydride is mixed with the compounds, such as the polyol, that are reactive toward the isocyanates.** Column 3, lines 70-75, Column 4, lines 1-9. Radovich generally discloses flexible polyurethane foams formed with isocyanates and polyols such that the resultant foam has a density of from 30 kg/m<sup>3</sup> to 52 kg/m<sup>3</sup>. Radovich does not disclose, teach, or suggest using acid anhydrides in a mixture with the isocyanates to form the foam. The foams formed in Radovich are formed in the presence of alkanolamines as set forth in the examples.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the

claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP '2143 - '2143.03 for decisions pertinent to each of these criteria.

As further clarified by the Court in *In re Sang Su Lee*, 277 F.3d 1338 (Fed. Cir. 2002), citing *Brown & Williamson Tobacco Corp. v. Phillip Morris, Inc.*, 229 F.3d 1120, 1124-25 (Fed. Cir. 2000), for a rejection of a claim under 35 U.S.C. § 103(a), it is required that there be some teaching or motivation found within the references themselves that would lead one of ordinary skill in the art to combine the references and, furthermore, that once combined the references must either disclose each and every limitation of the claim or make obvious any such limitations not disclosed. Absent a teaching or motivation within the references themselves for combining the references, it is improper for the Examiner to combine the references. *Id.*

There is no suggestion or motivation in the references, individually or when combined, to substitute the acid anhydride in the polyol component in Porter with the foam formed in Radovich to arrive at the invention as claimed where the isocyanate is present in a mixture with the acid anhydride. To the contrary, Porter teaches using the acid anhydride in the polyol to extend the storage life of the polyol prior to use in forming the foamed product. The subject invention has found, instead, that using the acid anhydride with the polyols lessen the benefits because the amine catalysts and the water present in the polyols contribute to the hydrolysis of the anhydride and reduces the activity of the catalysis even before the reaction is carried out. One aspect of the subject invention is to stabilize the foamed product when exposed to higher temperatures, not to improve the storage of the individual components used to form the foamed product.

Further, Porter does not disclose, teach, or suggest forming foams having a density of 20 kg/m<sup>3</sup> to 70 kg/m<sup>3</sup>. The Examiner relies on Radovich for a teaching of foams having a density as claimed in the subject application. The Examiner arrives at the density of Radovich by using 1.7-3.2 parts water per 100 parts polyol. Porter is silent as to a density of their foamed product, however, one example, out of seven examples, discloses using 2.9 parts of water per 100 parts

polyol to form a foamed product. The other six examples disclose water being present in an amount greater than 3.2 parts per 100 parts polyol. The Examiner cites this single example as evidence that the foams in Porter have the requisite density as that of the claimed invention. Those skilled in the art understand that more than water effects the density of the foamed product. Other contributing factors include the make-up of the polyols used, the type and amounts of catalysts used, type of blowing agent, whether other blowing agents are present, and so forth. There is no single component that can be solely attributed to the resultant density of the foamed product without considering the remaining components. Moreover, the subject invention discloses using 0.47 parts of water per 100 parts polyol in Examples 10-13, but this does not mean that the foamed product did not have a density of between  $20 \text{ kg/m}^3$  to  $70 \text{ kg/m}^3$ . Additionally, the polyols used in Radovich are significantly different than those used in Porter. The examples of Porter include a polyol having the mixture of the acid anhydride, the polysiloxane-polyoxyalkylene copolymer, and the polysiloxane-polyalkyleneoxy copolymer, whereas Radovich does not. This specific mixture disclosed in Porter would have a significant effect on the density as compared to the foams in Radovich which include typical ethylene-oxide, propylene-oxide polyols.

Finally, even if the references could be combined, each and every limitation of the subject invention is not taught nor suggested. Specifically, when combined, the references do not teach or suggest a mattress material and/or upholstery material and/or carpet material comprising a flexible polyurethane foam having a **density of 20 to  $70 \text{ kg/m}^3$** , wherein the foam is the reaction product of **a mixture of isocyanate and acid anhydride** with compounds reactive toward the isocyanate. As discussed above, Porter and Radovich fail to disclose, teach, or suggest, a mixture of acid anhydride and isocyanate used to form a high density foam. Furthermore, the limitation of carrying out the reaction in the presence of at least one organic or inorganic acid anhydride and at least one urethane forming catalyst selected from the group consisting of organic amines, **excluding alkanolamines**, and organic metal compounds is not disclosed, taught, nor suggested by the references individually or when combined. Instead, Radovich specifically carries out the reaction to form the foamed

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product in the presence of alkanolamines. Therefore, based on the foregoing, the combination does not teach, suggest, or disclose the novel combination of claim 1 and the §103 rejections are overcome and claims 1-3 and 11, as amended, are allowable.

Accordingly, it is respectfully submitted that the Application, as amended, is now presented in condition for allowance, which allowance is respectfully solicited. Applicant believes that no fees are due, however, if any become required, the Commissioner is hereby authorized to charge any additional fees or credit any overpayments to Deposit Account 08-2789. Further and favorable reconsideration of the outstanding Office Action is hereby requested.

Respectfully submitted

**HOWARD & HOWARD ATTORNEYS, P.C.**



November 5, 2003

Date

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**CERTIFICATE OF MAILING**

I hereby certify that the attached **Amendment** is being deposited with the United States Postal Service as first class mail, postage prepaid, in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450, on November 5, 2003.

  
Brenda J. Hughes

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